Organoid Modeling of Human Cortical Microcircuits

Grant Award Details

Organoid Modeling of Human Cortical Microcircuits

Grant Type: Inception - Discovery Stage Research Projects

Grant Number: DISC1-08819

Project Objective: To address these deficiencies by developing reliable and consistent organoid differentiation methods for producing 3-dimensional cortical structures containing both excitatory and inhibitory interneurons. We will also use lineage-tracing and electrophysiological recording methods to investigate the ability of organoids to establish cortical columns defined by the interconnection of groups of neurons derived from a common progenitor.

Investigator:

Name:	Bennett Novitch
Institution:	University of California, Los Angeles
Type:	PI

Disease Focus: Neurological Disorders

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $208,916

Status: Closed

Progress Reports

Reporting Period: Year 2

View Report

Grant Application Details

Application Title: Organoid Modeling of Human Cortical Microcircuits

Public Abstract:

Research Objective

The proposed studies will develop three-dimensional cell culture methods for creating human brain neural circuits for disease research and drug discovery.

Impact

The proposed research will develop a new research platform for studying how neurons in the human brain function, how neurological disease subverts this activity, and how we might find new therapies.

Major Proposed Activities

- Develop robust and reliable methods for creating three-dimensional organoid ("mini-brain") structures from human pluripotent stem cells.
- Measure the ability of neurons within mini-brain structures to form functional connections with one another that resemble those seen in the human brain.
- Determine how mini-brain neurons are organized at a larger network level to better model the normal and pathological activities of the human brain.

Statement of Benefit to California:

Neurological diseases are among the most debilitating medical conditions that affect millions of Californians each year, and many more worldwide. Few effective treatments for these diseases currently exist, in part because we know very little about the mechanisms underlying these conditions. Our proposed studies will develop an innovative cell culture platform to create a facsimile of human brain circuits that will enable us to better understand disease pathologies and discover new therapies.

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